CDR Entrance Criteria Questions

1. Program schedule

1.1 Does the Program have an updated schedule with sufficient detail to support development? Are the tasks linked?

1.1.1 Has the software schedule been updated based upon the detailed software design?

1.1.2 Has the software schedule been updated based upon actual measured project software development performance and productivity to date?

1.1.3 Has the software schedule changed since the beginning of the project? What were the causes of these changes?

1.1.4 Were any problems that caused schedule slips identified as risks prior to their occurrence? If not, why not? If yes, why didn't the associated mitigation plan succeed?

1.1.4.1 Is the schedule built upon bottom-up task planning?

1.1.4.2 Is the schedule reflective of available resources?

1.1.4.3 Does the program schedule have an identified critical path and is that critical path consistent with overall technical risk?

1.1.4.4 Are any components of the software on the projects critical path? What are those components?

1.1.5 If software is not currently on the project critical path, how much must the software development slip before it is on the critical path?

1.1.6 What is the critical path for the software development aspect of the project only?

1.1.7 Are there any hardware (Commercial Off The Shelf (COTS), Government Off The Shelf (GOTS) or project specific) deliverables on the software development critical path?

1.1.8 Are there any software deliverables from outside sources (COTS, GOTS on the software development critical path?

1.1.9 What is the status versus Critical Path?

2. Management Metrics

2.1 Cost / Schedule / Performance / Key Performance Parameters (KPP) – Status versus Plan. Is the latest revised estimate of each KPP in accordance with the Acquisition Program Baseline? Are the KPP's reflective of program risks and technical results?

2.2 Latest cost estimate – Is the cost estimate consistent with the technical risk of the program, the critical path plan and available resources?

2.2.1 Has the software estimate been updated based upon the detailed software design?

2.2.3 Has the software estimate been updated based upon actual measured project software development performance and productivity to date?

2.2.4 Has cost of acquiring, licensing and configuring COTS and/or GOTS computer hardware and software been considered?

2.2.5 Has COTS and/or GOTS computer hardware and software obsolescence and upgrade impacts been considered as part of the estimate?

2.2.6 Has the software cost changed since the beginning of the project? What were the causes of these changes?

2.2.7 Were any problems that caused schedule slips identified as risks prior to their occurrence? If not, why not? If yes, why didn't the associated mitigation plan succeed?

2.3 Estimate of production costs – Is the estimate for production costs consistent with the detailed design as disclosed? Are all elements of production cost addressed?

2.4 Estimate of Operation & Support (O&S) Costs – Is the estimate for O&S costs consistent with the detailed design as disclosed? Are all elements of O & S cost addressed?

2.4.1 Has cost of acquiring, licensing and configuring COTS and/or GOTS computer hardware and software been considered?

2.4.2 Has COTS and/or GOTS computer hardware and software obsolescence and upgrade impacts been considered as part of the estimate?

2.5 Have supportability analysis products from the system integration work effort been made available to the cognizant PDR participants prior to the review?

2.6 Are the current logistics documents available for review (Acquisition Logistics Support Plan, Logistics Requirements Funding Summary (LRFS), and Preliminary Maintenance Plan)?

2.7 Have all prior logistics review RFA's been properly dispositioned, and closed?

2.8 Earned Value Management (EVM)

2.8.1 Is the EVM data up-to-date?

2.8.2 Is the EVM baseline being used as a program execution tool (i.e. by management and at the working level?)

2.8.3 Are the work packages based on earned value vice level of effort?

2.8.4 Is the EVM data consistent with known technical risks and challenges in the program?

2.8.5 Are the EVM data being used to adjust program resources to address risk issues?

2.8.6 Have the metrics to track EVM been clearly articulated and have sufficient fidelity to understand the status of the product development?

2.9 Work Breakdown Structure (WBS) review

2.9.1 Is the WBS consistent with the technical risks of the program?

2.9.2 Is the WBS broken down to an appropriately detailed level to address all technical tasks?

2.9.3 Are all Configuration Items (CI) (including software), as identified in the detailed design, addressed in the WBS?

2.9.4 Are the requirements tracked, traced, and modeled using an automated tool?

2.10 Software metrics – Has a software metrics program been implemented?

2.10.1 Are adequate software metrics in place and being used to manage the software effort?

2.10.2 Do the metrics indicate status versus plan? What level of risk do the metrics indicate?

2.10.3 Staffing level metrics – Is the software staffing adequate for the magnitude/complexity of the software and the level of software risk?

2.10.4 Size metrics – Are the software sizing metrics adequate and consistent with the detailed design? Do they indicate readiness for coding/testing?

2.10.5 Are Computer resource utilization metrics and/or Technical Performance Measures (TPM) known and allocated to individual processors, IO, Random Access Memory (RAM), Read Only Memory (ROM) and other storage media?

2.10.6 Are other software complexity metrics being used and do these metrics indicate adequate understanding of complexity versus resources (schedule, funding, and staff) available to ensure coding/testing success?

2.10.7 Does the SOW require the contractor to define, establish, and operate a metrics data collection, analysis, and reporting system that provides quantitative information on key software program management issues?

2.10.8 Are metrics used to track and manage the software requirements changes, deletions and additions (software requirements volatility)?

2.10.9 Are metrics used to manage the implementation of software requirements in accordance with the program cost and schedule plan? Note: If EVM is identified as the metric for managing and insuring that software requirements are being implemented in accordance with the project cost and schedule plan, allocation of earned value must be tied directly to the correct implementation of software requirements.

2.10.10 Are metrics used to insure that quality is designed and built into the software rather than attempting to test it in? What metrics have been used to track quality during the software requirements and software design phase?

2.10.11 Are appropriate metrics in place to allow the tracking, management, and mitigation of significant software risks?

2.10.12 For ACAT IA, IC, ID with a software development effort exceeding $25M (FY02 dollars), have Software Resource Data Reports (SRDR) in accordance with DoD Instruction 5000.2 12 May 03 and DoD 5000.4-M-2?

3. Program Staffing

3.1 Is there a complete organization structure shown and is the organization consistent with the technical challenges/risks of the program?

3.2 Are key government / contractor interfaces identified and are these consistent with program risks?

3.3 Is adequate staffing (required expertise and quantity of expertise for both the contractor and the government) available to execute the schedule? Is there confidence that all required users are involved and do they concur with the detailed design?

4. Process Review

4.1 Program Management processes as detailed in the Program Management Plan – Are the program management processes that are in place adequate to address the technical challenges of the program and adequate to address program risks?

4.1.1 Is there an updated Program Management Plan that is reflective of the emergent technical issues and risks?

4.1.2 Are there Program Management processes in place to properly manage the detailed design, prototype fabrication, testing, and attendant technical emphasis areas?

4.1.3 Is the program being managed to adjust resources to address issues in the detailed design, prototype fabrication and testing?

4.2 Configuration Management processes as detailed in the CM Plan

4.2.1 Is the CM plan in place and up-to-date?

4.2.2 Is the detailed design (each Configuration Item (CI)) documented and being managed in accordance with the CM Plan?

4.2.3 Are changes to the managed CI configurations controlled and tracked to higher level (System Specification and Capability Development Document (CDD)/ Capability Production Document (CPD) - formerly Operational Requirements Document), and lower level (detailed design) documents?

4.3 Systems Engineering processes as detailed in the Systems Engineering Plan

4.3.1 Is there a defined system engineering process?

4.3.2 Are the processes shared by the government and contractor team?

4.3.3 Are the SE processes for design development and system trades in place and being used?

4.3.4 Are the planned technical reviews in place and properly placed (event driven vice schedule driven)?

4.3.5 Are the SE processes adequate to support the technical requirements of the technical reviews? Are the technical teams working against a defined technical baseline?

4.4 Acquisition Logistics Support Management & Staffing

4.4.1 Has the ALSP been updated to reflect the maintenance and support concepts at both the system and major hardware configuration item levels?

4.4.2 Have Alternative Logistics Concepts been adequately considered and preliminary cost-benefit trades conducted to justify the product support strategy in the ALSP?

4.4.3 Does the ALSP reflect force provider performance agreements pertaining to logistics (if any)? At minimum, user representative reviews and comments concerning maintenance planning and support concepts should be appropriately considered.

4.5 Risk Management processes as detailed in the Risk Management Plan

4.5.1 Is there a defined risk management process? Is the Risk Management Plan up to date and being used?

4.5.2 Is the risk management process shared by the government and contractor team?

4.5.3 Does the risk management process properly track all risks on a continuous basis and provide for update of the mitigation approaches?

4.5.4 Are mitigation approaches in place for all yellow and red risks? Are risk mitigations resourced?

4.5.5 Does the risk management process provide for risk updates to support the technical reviews and program management (acquisition) reviews?

4.5.6 Is the system's safety Risk mitigation plan being managed by the program Risk Management Board?

4.6 Logistics Budgeting and Funding

4.6.1 Has the program office prepared a Logistics Requirements and Funding Summary (LRFS) or equivalent document?

4.6.1.1 Is there adequate documentation to support the requirements identified in the LRFS?

4.6.1.2 Do the funding requirements in the LRFS coincide with the support requirements in the ALSP and other planning documents?

4.6.1.3 Are the impacts of funding shortfalls understood and plans in place to mitigate risk?

4.6.2 Has the LRFS been staffed and approved?

4.7 Test processes as detailed in the Test and Evaluation Master Plan (TEMP) and the contractor's overarching T&E Strategy.

4.7.1 Has the TEMP been updated to reflect the required detail for the PDR timeframe? Does Section V of the TEMP address all required resources?

4.7.2 Does the contractor's T&E Strategy meet the TEMP requirements?

4.7.3 Has detailed test planning been initiated? Are test plans for the first six months of test flights in a Draft status?

4.7.4 Is there a clear understanding of the user's deficiency documentation process and is there plan for deficiency documentation and tracking system

4.7.5 Are test requirements tied to verification requirements? Is there a method to ensure traceability of test requirements to the verification requirements?

4.7.6 Have metrics been established to track the test program?

4.7.7 Does the TEMP reflect FORCEnet requirements?

4.7.8 Does the TEMP address metrics and test procedures to ensure that Human Integration requirements for each domain are delivered and satisfy the CDD/CPD requirements?

4.7.9 Have facilities/test resources (contractor and government) been defined and included in the test planning?

4.7.10 Is there User buy-in to the above test planning? Are there provisions for User participation?

4.7.11 Has OT been involved with all aspects of test planning? Are OT requirements considered as a part of DT planning?

4.7.12 Is the flight clearance process established to include definitions of the levels of clearance authority?

4.8 Production processes (ISO 9000, etc.)

4.8.1 Have production processes been considered in the detailed design?

4.8.2 Have production requirements been properly captured and addressed in the risk assessment?

4.8.3 Have long-lead items been identified and are production processes sufficiently mature for this phase of the program?

4.8.4 Where applicable, have Unique Identification (UID) requirements been incorporated? (e.g., MIL-STD-130)

4.9 Program utilization of lessons learned

4.9.1 Have the lessons learned by other programs been utilized to reduce risk?

4.10 Software

4.10.1 Is the software development lifecycle appropriate to the development? Does the software lifecycle being used contribute to reducing overall software development risk?

4.10.2 Are software requirements allocated to COTS, GOTS and reused software appropriate?

4.10.2.1 Does the implementation of COTS, GOTS and/or reused software meet the allocated software requirements?

4.10.2.2 Is the development team familiar with and/or trained in the use of the COTS, GOTS or reused software? If

not, is documentation readily available? Is training readily available and has it been scheduled and budgeted for?

4.10.2.3 Is the COTS, GOTS or reused software fully tested and reliable? If not has adequate schedule and resources been included to test and rework it? Also if not, why is it being used?

4.10.3 If COTS or GOTS computer hardware and/or software is being used, has COTS and/or GOTS obsolescence issues been considered?

4.10.3.1 Has the long term viability of the COTS and/or GOTS product provider been considered for the program life-cycle?

4.10.3.2 Are COTS and/or GOTS software and computer hardware upgrades caused by COTS and/or GOTS obsolescence considered for both the software development and the remainder of the software lifecycle?

4.10.3.3 Has the likely impact of updating a component of COTS and/or GOTS computer hardware or software been considered in respect to how it may force other COTS and/or GOTS upgrades?

4.10.3.4 Has the impact on the projects custom software of COTS and/or GOTS computer hardware and/or software upgrades been considered?

4.10.3.5 Are the impacts of COTS and/or GOTS software and computer hardware obsolescence and upgrades on the software development and integration environment considered?

4.10.4 Are facilities and resources available or in development to support: software integration testing, formal qualification testing, systems testing, DT, and OT?

4.10.4.1 Have adequate hardware, software, personnel, and spares been allocated to laboratory, ground and flight testing to achieve the program schedule?

4.10.4.2 Does the program place an excessive and or unreasonable emphasis on ground, flight, or laboratory testing? Is the appropriate and most cost effective means of testing utilized for different testing phases?

4.10.4.3 If the systems and software integration laboratory resources are planned to be used for spares for flight or ground testing, have the impact on the testing schedule of the laboratory(s) being unavailable been considered?

4.10.4.4 Are there any test environment resource limitations that may result in a bottleneck or chokepoint in testing? What actions have been taken to mitigate these bottlenecks or chokepoints?

4.10.4.5 Are adequate resources and schedule provided for the development and or modification of any special purpose test, simulation and/or data analysis software for use during the software development provided?

4.10.5 Is the software developer performing at a Software-Capability Maturity Model (SW-CMMI) or CMMI level III as required by some buying activity requirements?

4.10.5.1 If the software developer is performing at below a SW-CMM or CMMI Level III, what mitigating action is being taken to reduce the increased risk of cost, schedule and quality deficiencies?

4.10.5.2 If the software developer is performing at below the SW-CMM or CMMI Level they proposed during source selection, what are the cause and what corrective action is being taken?

4.10.6 What software data rights have been procured by the Government and are they consistent with the Governments plans for maintenance and upgrade of the software over its lifecycle?

4.10.7 Are physical security and software security implementation consistent with the security level of the software and/or any data and/or crypto stored and managed by the software both during development and during operational use?

4.10.8 Are peer reviews of the software requirements and software detailed design part of exit criteria for determining if they are complete and placing them under configuration control?

4.10.9 Have software quality criteria for entrance into OT been identified?

4.10.10 Is the software development lifecycle appropriate to the development? Does the software lifecycle being used contribute to reducing overall software development risk?

5. Requirements Management

5.1 Is there a process in place for requirements management and is it being applied to properly address this stage of the program?

5.2 Are requirements being managed and traced from higher level (parent) requirements to lower level (offspring) requirements? Are there any orphan or childless requirements?

5.2.1 Is full traceability from systems requirements allocated to software provided through: software requirements, software design, interface requirements, interface design, source code and test procedures?

5.2.2 Are any COTS, GOTS or reused software traced to: systems requirements, software requirements, interface requirements, interface design, software design, and test procedures?

5.3 Have airworthiness or similar system-specific safety requirements been addressed and documented in the detailed design?

5.4 Does the contract specification contain Human Integration requirements for each domain and are they traced back to CDD/CPD requirements?

5.5 Have the trades, made among the HSI domains, influenced economic and risk based design decisions that contribute to the blended solution?

5.6 Is adequate requirements traceability in place to ensure compliance with the CDD/CPD/ORD at OT&E?

5.7 Are both effectiveness and suitability requirements being addressed and allocated in the detailed design?

5.8 Are there plans in place to ensure test requirements are addressed and documented to the same level of detail as functional requirements (operation and suitability)?

5.9 For CDR, has a Product Baseline, or equivalent, been established and is it complete? Is this baseline under CM control?

5.9.1 Are the software detailed design documents complete and under configuration control?

5.9.2 Are the interface design documents complete and under configuration control?

6. System Planning and Detailed Design

6.1 Are Subsystem requirements traced to system requirements (and CDD/CPD/ORD)?

6.2 Is the Subsystem detailed design traced to subsystem requirements?

6.3 For the overall system, and each Configuration Item, the following system requirements should be assessed, as applicable:

6.3.1 Have the KPP's and other performance requirements, both explicit and derived been defined, quantified and documented?

6.3.2 Have all functional requirements in the functional baseline been allocated to a CI and are these documented in the detailed design and allocated baseline?

6.3.3 Have Functional Interface Requirements been defined and included in the detailed design?

6.3.4 If applicable, have airworthiness considerations been addressed? Is there a plan for flight clearance?

6.3.5 Reliability and Maintainability (R&M)

3.5.1) Have Reliability and Maintainability and Built-In-Test (BIT) requirements been addressed in the system detailed designs?

3.5.2) Is the final mission profile definition complete and does it accurately define the expected Fleet operational environment?

3.5.3) Are the final R&M block diagrams and math models complete, accurate, and do they meet the required mission reliability performance requirements?

3.5.4) Is the final Failure Modes, Effects and Criticality Analysis (FMECA) complete and accurate with specific examples of design changes implemented to eliminate single point failure modes and/or improve overall weapons system reliability?

7. Critical Safety Items (CSI)

7.1 Have all critical safety items and critical application items been identified? Are the lists accurate and all inclusive? Do drawings and associated technical data confirm that critical safety items are clearly identified, along with critical and major characteristics, tolerances, critical processes and inspection, and other quality assurance requirements?

7.2 Are R&M allocations complete and accurate?

7.3 Are the final Reliability predictions using piece part stress technique complete, and do they meet all specified Reliability performance requirements in accordance with buying activity guidelines?

7.4 Are the final Maintainability predictions complete, and do they meet all specified Maintainability performance requirements in accordance with buying activity guidelines?

7.5 Have lessons learned been addressed, and implemented where applicable?

7.6 Are trade studies complete, and implemented where applicable?

7.7 Have buying activity R&M Risk Assessment questions been completed, and potential mitigation provided?

7.8 Have test methodologies and metrics for R&M requirements been defined? Is there concurrence on the methodology/metrics from OT?

8. System Safety

8.1 Have program systems safety requirements and goals been successfully achieved per MIL-STD-882 at an optimal level?

8.1.1 Have program hazards identified through the systems safety initiatives been mitigated or actions to eliminate been put in place?

9. Technical Data

9.1 Has a designated Government technical data review authority been established?

9.2 Has an Integrated Digital Environment (IDE) implementation plan been identified as a proposal requirement of the Request For Proposal and/or as a contract deliverable?

9.3 Is there a clear plan for the integration of contractor technical information systems and processes for engineering, manufacturing, and logistics support?

9.4 Is the government authorized access to contractor databases necessary to support Systems Demonstration?

9.5 Does the delivery schedule for the Technical Data Package support a competitive production contract?

10. Computer Resources

10.1 Has the functional baseline for software been established?

10.2 Has a software configuration management plan been developed?

10.2.1 Is there a software configuration control board (CCB)?

10.2.2 Does both the government and the developer participate in the software CCB?

10.2.3 What are the criteria for making changes to the System, Allocated, and Product baselines? Are the impacts on the programs cost and schedule considered when changes are made to the System, Allocated or Program baselines?

10.2.4 What are the criteria for; approving, disapproving, opening, closing, deferring, etc., defects against software work products (documents and software)?

10.2.5 How is it ensured that defect corrections are not lost in subsequent software work product releases?

10.2.6 How is it ensured that the correct versions of the different software work products are associated with each other? Example: How do we insure that the correct version of the software requirements, software design, software source, software executables and software test procedures are all associated?

10.2.7 Have measures of effectiveness for software been developed for Systems Demonstration?

10.2.8 How does the Test and Evaluation Master Plan (TEMP) address testing of computer hardware and software?

10.2.9 Have requirements for system firmware and software documentation been identified and procured?

11. Design Interface

11.1 Have testability, maintainability and supportability requirements been defined and adequately considered in the preliminary design?

11.2 Have the results of FMECA been integrated with the Supportability Analysis program?

11.3 Do design processes include adherence to specific derating guidelines, particularly for electronic and electrical components?

11.4 Is qualification testing planned to support design limit/life testing during System Demonstration?

11.5 Do the parts and material selection processes ensure items are qualified to the worst case Design Reference Mission Profile and design environment?

12. System Verification

12.1 Does the Requirements Verification Matrix exist and does it accurately reflect the CDD/CPD/ORD requirements?

12.2 Is the detailed design of each CI consistent with the subsystem test planning and approach?

12.3 Is the detailed design of each CI consistent with the system test planning and approach?

13. Program Risk Assessment

13.1 Have risk items in the detailed design been defined and analyzed?

13.2 Is the risk assessment process tightly coupled with the technical effort and reflective of the technical risks inherent in the detailed design?

13.3 Has the risk assessment addressed future risks to developmental test, operational test, training, and production/fielding of the system?

13.4 Is there adequate buy-in among the technical team as to risks and mitigations?

13.5 Is the technical risk assessment being shared at all levels of the Program Team?

13.6 Have supportability and logistics risk items been defined, analyzed, and included in the Program Risk Assessment?

13.7 Have cost and schedule impacts for supportability and logistics risk mitigation been documented and identified in the LRFS?